Human Development
Chapter 9 – Middle Childhood: Physical & Cognitive Development

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Middle childhood in western nations is about 6 yr. to 12 yr. (elementary school years)

According to Piaget, this begins marks the beginning of concrete operational thought.

Erikson called this psycho-social age the period of *industry* (L. *to produce or build*).

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Physical, cognitive, and psychosocial factors interact to produce individual development.

Myelination of the reticular formation allows for longer periods of focus.

Physical and Motor Development

Given opportunity and training, children can refine motor abilities. (Bicycle, swim, jump, music, group sports)

Physical growth and change

Growth is slower and steadier than in first 2 yr.

Avg. 6 yr. weighs 45 lbs. (20.4 Kg.) & 3.5 ft. (1m)

Adolescent growth spurt begins about 9 yr. for girls and 11 for boys.

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Internal Changes

Skeletal Maturation

Bones grow longer sometimes causing pain. Episodes of stiffness and aching occur, especially common at night.

Skeletal and ligaments are not mature and too much physical training could cause injuries.

6 – 7 yr. loose primary (baby) teeth. (Toothless smile)

Permanent teeth look too big for head at first. (Beaver tooth grin)

Fat & Muscle Tissue

Fat deposits decrease starting at 6 mo. until 6 – 8 yr.

Strength is comparable between girls and boys.

Brain Development

The forebrain undergoes a growth spurt between 6 – 8 yr. By 8 yr. brain is 90% of it's adult size.

The surface area of frontal lobes increases by continuing branching of neurons.

The corpus callosum matures. Lateralization becomes more pronounced.

Coincident with Piaget's transition to concrete operational thought. (Coincidence?)

Development of Motor Skills

Gross Motor Skills

They become stronger and more coordinated.

Locomotive skills in place by 5 yr. Children are now interested in sports and daredevil stunts.

7 yr. boys throw a ball about 34 ft
10 yr. boys throw about 68 ft.
12 yr. boys throw about 102 ft.

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Girls make similar progress but slightly shorter. (Due to opportunities and cultural expectations)

Fine Motor Skills

Fine motor skills develop rapidly. Children progressively construct more complex shapes, which require greater eye-hand coordination.

Normal children often can not make diamond shapes or master letters until 8 yr.

Health, Fitness, and Accidents

This can be one of the healthiest periods in life. Most 6 – 12 experience few illnesses.

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Better health due to immunities established in earlier life, better nutrition and improved safety habits.

Minor illnesses may assist in psychological development by providing opportunity to deal with stress

Table 9-1 Physical Development during Middle Childhood

5- to 6- Year-Olds
- Steady increase in height and weight
- Steady growth in strength – boys & girls
- Growing awareness of the placement and actions of large body parts
- Increased use of all body parts
- Improvement in gross motor skills
- Performance of motor skills singly

7- to 8- Year Olds
- Steady increase in height and weight
- Steady growth in strength – boys & girls
- Increased use of all body parts
- Refinement of gross motor skills
- Improvement in fine motor skills
- Increasing variability in motor skill performance but still performed singly

9- to 10- Year Olds
- Beginning of growth spurts for girls
- Increase in strength for girls accompanied by loss of flexibility
- Awareness and development of all body parts and systems
- Ability to combine motor skills more fluidly
- Balance improvement

11- Year Olds
- Girls generally taller and heavier than boys
- Beginning of growth spurts in boys
- Accurate judgement in intercepting moving objects
- Continued improvement of fine motor skills
- Continued combination of more fluid motor skills
- Continued increasing variability in motor skill performance

Obesity

Seriously overweight – NCHS defines as weighing the same or more than 95% of children the same age.

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14% of US children are obese and 70% of obese children become obese adults

A child with one obese parent has 40% likelihood of becoming obese – 80% if both parents are obese.

Genetics + environment (lifestyle)

Adopted children more closely resemble biological parents than adoptive parents

Environmental Factors include TY watching, snacks while watching, computers/video games, sweetened drinks, and parental encouragement to eat.

Seriously overweight children should not be put on drastic weight loss programs but maintainable healthy habits instead.

Physical Fitness

Often defined as lack of illness. A better measure is optimal functioning of heart, lungs, muscles, and blood vessels.

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The four aspects of conditioning include *flexibility, muscle endurance*, *muscular strength*, and *cardiovascular efficiency*.

Some activities are better than others. Football and Baseball are pretty bad

The establishment of physical fitness habits are critical at this time.

- Parents provide good nutrition
- Model healthy lifestyle
- Engage in regular exercise
- Limit time at TV and computer
- Encourage PE in school

Physical Education in School

Physical education – is defined as a program of carefully planned and conducted motor activities that prepare students for skillful, fit and knowledgeable performance.

Accidents and Injuries

Growth in size and strength leads to increasingly dangerous activities.

Accidents (primarily motor vehicle) cause more deaths (about ½ of all childhood deaths) than pneumonia/influenza, heart disease, congenial anomalies, cancers, suicide, and homicide combined.

Accidents are also the leading cause of childhood physical disabilities.

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Cognitive Development

Two major approaches to studying cognition are: *cognitive-development theory* and *information processing theory*.

Piaget and Concrete Operational Thinking

Cognitive Abilities

Age 5 – 7 yr. marks the transition from preoperational to concrete operational thought.

Table 9-2 Preoperational vs. Concrete Operational Thought

Preoperational (2 to 5-7 yr.)
- Rigid and static
- Irreversible
- Focus on the here and now
- Centered on one dimension
- Egocentric
- Focus of perceptual evidence
- Intuitive

Concrete Operational (5-7 to 12 yr.)
- Flexible
- Reversible
- Not limited to here and now
- Multidimensional
- Less egocentric
- Marked by use of logical inferences (construct theories & understanding)
- Marked by search for cause-and-effect relationships (understand relationships, problem solving, within realistic contexts)
- Marked by "learn by experiencing/doing"

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Transition from preoperational to concrete operational thinking takes years of experiencing and learning about the environment.

Piaget and Education

Just as infants benefit from stimulation slightly ahead of their development level, preoperational children may be helped into concrete operational thought if readiness is present.

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Addition and subtraction involve an understanding of reversibility.
(2 + 3 = 3 + 2 and 5 + 8 = 13; 13 – 5 = 8)

Piaget's theory says children are active learners who construct their own theories and are self-motivated to change the theories if pieces don't fit.

Educators should show rather than tell.

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Information Processing

Memory and *metacognition* show considerable development during middle childhood.

Memory

Preoperational children do well at recognition. Concrete Operational children also do much better at recall and begin using control process – strategies and techniques to enhance memory.

1. *Rehearsal* – at first, simple repetition but at 9 yr. they begin chunking which increases short-term storage and long-term memory transfer.
2. *Organization* – simple association in young; by categories in older children.
3. *Semantic elaboration* – inferring information from the given data. (e.g. "He swept the floor." implies a broom is present)
4. *Mental imagery* – constructing a mental picture to aid in learning.
5. *Retrieval* – Older children have better retrieval strategies
6. *Scripts* – schematics for routine events that can be modified with "fill-in slots" for more efficient use of memory

Metacognition

Metacognition – the intellectual process that allows the monitoring of ones own thinking. (Thinking about thinking)

Metacognitive abilities emerge around 6 yr. and develop between 7 – 10 yr.

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Language and Literacy

Oral and written language becomes more refined. Vocabulary increases, and grammar gains complexity.

Literacy

Older children learn symbolic relationship between letters and sounds and how to elicit meaning from print.

Connections between form and meaning connect us to others and help us organize our own feelings, experiences and thoughts.

Whole-language looks at the interconnectedness of written and oral language and the concept of emergent literacy.

Parents and teachers are important for acquiring literacy in teaching knowledge and skills, but peers enable spontaneous oral opportunities in sharing ideas and problem solving.

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Table 9-3 Conditions That Promote Literacy

A print-rich environment
- Adults who read/write for their own purposes
- Frequent story-time experience
- Dictation experiences
- High-quality literature
- Conceptualized print
- Functional print
- Answers to questions about print

A rich oral language environment
- Adult language models
- Adults who listen to children
- Free exploration of oral language
- Peer conversation
- Dramatic role play
- Experiences in vocabulary enrichment
- Vocabulary information as requested

Firsthand experiences of interest
- Play
- Daily living
- Field trips
- Nature exploration

Symbolic representation of experiences
- Dramatic play
- Drawing and painting
- Music and dance

Pressure-free experimentation with writing
- Drawing
- Scribbling
- Non-phonetic writing
- Invented spelling

Pressure-free exploration of reading
- Reading from memory
- Reading with context cues
- Matching print to oral language

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Intelligence and Achievement

In 1940s and 1950s, dependence on testing with suspect instruments risked misinterpretation and over-interpreting leading to erroneous labeling.

Tests can be valuable tools when results are given in specific (and correctable) behavioral skills, rather than immutable personal characteristics.

Criterion-referenced tests – Tests that evaluate an individual's performance in relation to mastery of specified skills or objectives. (e.g. specific math skills)

Norm-referenced tests – Tests that compare an individual's performance with performers in the same age group. (e.g. IQ and other intelligence tests)

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Intelligence testing

Intelligence testing is important because we deem it to be important. It can have far reaching effects on future opportunities in education, jobs, and society as well as affecting self-image.

The Stanford-Binet Test

Developed by Alfred Binet in France and adapted by Lewis Terman in the US, it looks at problem solving, definitions, and general knowledge to arrive at a *mental age* (MA). It was widely used in 40s and 50s.

The Intelligence Quotient

This is an extension of the Stanford-Binet in that it divides the *mental age* by *chronological age* allowing it to compare children of different ages.

The Wechsler Tests

IQ testing assumes lock-step development based on age as its norm. Wechsler approach references the norm performance of the individual against the statistical scores on others in the same age group.

IQ is assumed to be normally distributed with a mean of 100; 1 SD (68%) between 85 and 115; and 2 SD (96%) between 70 and 130.

It measures current performance only, not *intelligence potential*.

The Nature of Intelligence

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Innate vs. Learned

Nature/Nurture is extremely controversial when it comes to intelligence. Current view is that it is about ½ and ½ but an individual's race is not an indicator of cognitive ability.

General and Specific Abilities

Intelligence tests can be one dimensional or multi-dimensional.

Gardner proposed 7 (now 8) areas of intelligence based on studies of neurology, psychology, and human evolutionary history – including *linguistic, logical, mathematical, spatial, body-kinesthetic, musical, interpersonal,* and *intrapersonal* (the new one is *naturalist*).

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Robert Sternberg developed the triarchic concept of intelligence.

Contextual intelligence – adaptation to the environment (common sense)
Experiential intelligence – ability to cope with new/old tasks & situations
Componential intelligence – abilities measured by IQ tests

Limitations of Testing

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Educational dependence on "measurable and observable" reflects the popularity of behavioral objectives that are easy to measure and observe.

Less tangible competencies (ways of thinking, personality development) tend to be overlooked in the schools attempt to "measure up" to the test.

Table 9-4 Elements of Sternberg's Successful Intelligence

Definition of successful intelligence
- The ability to achieve success in life
- According to one's personal standards
- Within one's sociocultural context

Types of processing skills contributing to successful intelligence
- Analytical
- Creative
- Practical

Uses of processing skills for successful intelligence
- Adaptation to environments
- Shaping environments
- Selection of environments

Mechanisms for utilization of processing skills in successful intelligence
- Capitalization on strengths
- Correction of weaknesses
- Compensation for weaknesses

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Recently test designers are attempting to eliminate biases from their test.

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Learning and Thinking in School

Schools are crucial in the development of intellectual, physical, social, and emotional competencies.

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New Demands and Expectations

Children experience separation (maybe first time) from parents but also greater independence.

Teachers expect greater autonomy and independence and the greater the gap between home and school the more difficult the adjustment.

Teacher Activities
1. Teaching facts and concepts
2. Giving directions for a particular lesson
3. Stating general rules of behavior
4. Correcting, disciplining, and praising
5. Miscellaneous activities

Only 10 to 15% is typically spent on activities 1 & 2.

Developing Competent Learners and Critical Thinkers

Teaching strategies to develop student thinking
1. *Remembering*: Recalling a fact, idea or concept.
2. *Repeating*: Following a model or procedure.
3. *Reasoning*: Relating specifics to a general principle or concept.
4. *Reorganizing*: Extending knowledge to new contexts and devising original solutions to problems.
5. *Relating*: Connecting new knowledge to past or personal experience.
6. Reflecting: Exploring the thought itself and how it occurred.

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Teaching critical thinking is more difficult than imparting facts and principles.

Success in School

Factors influencing school success include health, nutrition, home situation, and self-esteem.

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Achievement motivation – persistence toward success and excellence – is an acquired, culturally based drive. – David McClelland

Gender Difference and School Success

Girls perform better verbally and boys perform better in quantitative and spatial tasks.

The reasons may include small sex differences in related brain development, different social expectations and biases in teacher interaction.

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Parental Influences on School Success

Parents have a profound effect on student success – both good and bad.

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Parental behavior that can lead toward success
1. Maintain realistic beliefs about current abilities but have high expectations for the future.
2. Maintain an authoritative rather than authoritarian parenting style.
3. Communicate on an intellectual level regularly, read, listen, explore, and model.

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Developmental Disorders

Mental Retardation

The Diagnostic and Statistical Manual (DSM-IV – APA) requires three criteria for diagnosis of Mental retardation.

1. Significantly sub-average intellectual functioning based on IQ scores.
2. Significantly impaired adaptive behaviors in areas such as self-care, self-direction, and general functioning at home and the community.
3. Onset before age 18.

The four levels of mental retardation are:
- Mild (IQ of about 55 to 70)
- Moderate (IQ of about 40 to 50)
- Severe (IQ of about 25 to 40)
- Profound (IQ below 25)

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Mildly retarded are generally educable, can hold a job with assistance.

Moderately retarded were previously labeled as "trainable" but with proper assistance can get around the neighborhood and hold jobs.

Severely and *Profoundly* retarded require close supervision, can perform simple tasks, limited self care, and tend to have known biological defects.

Learning Disorders

Also called learning disabilities, involve difficulties in acquiring certain skills but not others.

Sometimes labels are attached to normal students when they merely have trouble with a certain skill and needs extra help.

Three main categories of learning disorders defined by APA are;
- Dyslexia – Reading disorder
- Dysgraphia – Disorder of written expression
- Dyscalculia – Mathematics disorder

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Learning disorders are associated with one or more basic mental processes. (e.g. attention, memory, perception or cognitive control processes)

Early intervention shows better success.

Reading Disorder

Basic dyslexic children often confuse letters (b vs. d) or read anagrams (star vs. rats).

Most children make this kind of error at first but "grow out of it." Dyslexic children get stuck.

Dyslexia also manifests itself in spoken language errors.

Runs in families with left handedness but is only weakly associated.

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Attention-Deficit/Hyperactivity Disorder

The two disorders are separate but both tend to be exhibited hence the combination.

Possible cause is that ADHD are under-stimulated or all stimulation comes in at the same level. Or there is a limitation in the overall cognitive functioning.